MONITORING SYSTEM FOR ACADEMIC ACTIVITY OF MUHAMMADIYAH VOCATIONAL SCHOOL IN CENTRAL JAVA

Compiled as a condition to complete Strata I Program at the Informatics Department
Faculty of Communication and Information

Submitted by:

JONI
L 200 134 020

INFORMATICS DEPARTMENT
FACULTY OF COMMUNICATION AND INFORMATION
UNIVERSITAS **MUHAMMADIYAH SURAKARTA**
2017

APPROVAL PAGE

MONITORING SYSTEM FOR ACADEMIC ACTIVITY OF MUHAMMADIYAH VOCATIONAL SCHOOL IN CENTRAL JAVA

SCIENTIFIC PUBLICATION

submitted by:

JONI

L 200 134 020

Have been inspected and approved to be tested by :

Supervisor

Bana Handaga, S.T., M.T., Ph.D.

NIK.793 5/4 2017

ENDORSEMENT PAGE

MONITORING SYSTEM FOR ACADEMIC ACTIVITY OF MUHAMMADIYAH VOCATIONAL SCHOOL IN CENTRAL JAVA

SUBMITTED BY

JONI

L 200 134 020

It has been maintained in front of the Board of Examiners
Faculty of Communication and Information
Muhammadiyah Surakarta University
On Saturday, 15-04-2017
and declared eligible

Board of Examiners:

1. **Bana Handaga, S.T., M.T., Ph.D.** (.....)
   (Chairman of the Board of Examiners)
2. **Dr. Heru Supriyono, M.Sc.** (.....)
   (Members I Board of Examiners)
3. **Diah Priyawati, S.T., M.Eng.** (.....)
   (Members II Board of Examiners)

This scientific publication has been accepted as one of the requirements
To obtain a bachelor's degree
Date 15 April 2017
Knowing,

Dean
Faculty of Communication and Information

Husni Thamrin, S.T., M.T., Ph.D.
NIK : 706

Chairman of Program Study
Informatics

Dr. Heru Supriyono, M.Sc.
NIK:970

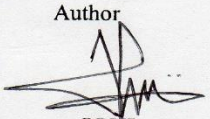
DECLARATION

I declare that this final project does not contain works that have been asked to obtain a degree at a university and all my knowledge also does not have work or opinions ever written or published by another person, except in writing referred to in the text and mentioned in the list of bibliography.

If there is untruth found in my statement above, then I will fully accountable.

Surakarta, 17 April 2017

Author



JONI

L 200 134 020

UNIVERSITAS MUHAMMADIYAH SURAKARTA
FAKULTAS KOMUNIKASI DAN INFORMATIKA
PROGRAM STUDI INFORMATIKA
Jl. A Yani Tromol Pos 1 Pabelan Kartasura Telp. (0271)717417, 719483 Fax (0271) 714448
Surakarta 57102 Indonesia. Web: http://informatika.ums.ac.id. Email: informatika@ums.ac.id

SURAT KETERANGAN LULUS PLAGIASI

012/A.3-II.3/INF-FKI/IV/2017

Assalamu'alaikum Wr. Wb

Biro Tugas Akhir Program Studi Informatika menerangkan bahwa :

Nama	:	JONI
NIM	:	L200134020
Judul	:	MONITORING SYSTEM FOR ACADEMIC ACTIVITY OF MUHAMMADIYAH VOCATIONAL SCHOOL IN CENTRAL JAVA
Program Studi	:	Informatika
Status	:	**Lulus**

Adalah benar-benar sudah lulus pengecekan plagiasi dari Naskah Publikasi Tugas Akhir, dengan menggunakan aplikasi Turnitin.

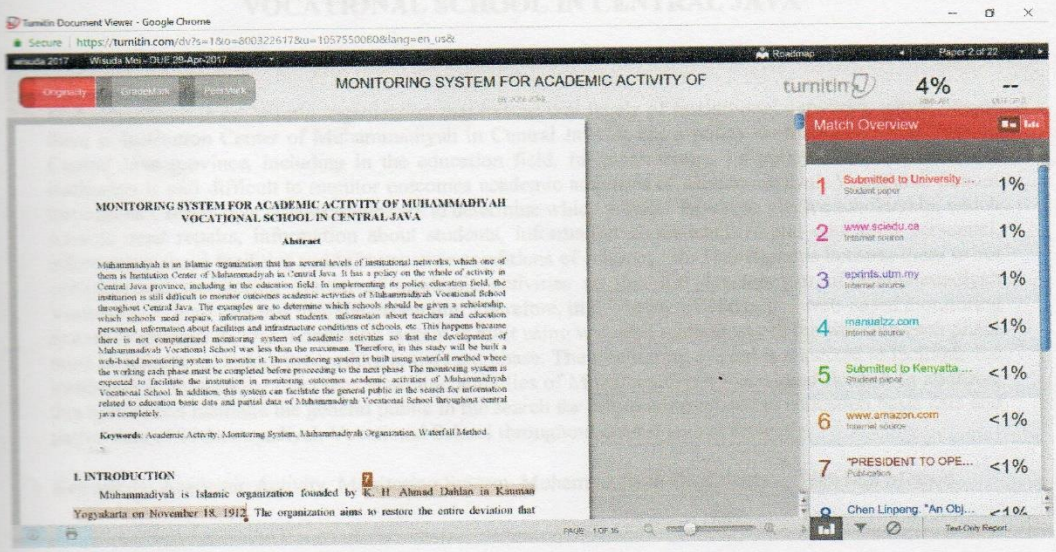
Demikian surat keterangan ini dibuat agar dipergunakan sebagaimana mestinya.

Wassalamu'alaikum Wr. Wb

Surakarta, 18 April 2017
Biro Tugas Akhir Informatika

Endang Wahyu Pamungkas, S.Kom., M.Kom.

UNIVERSITAS MUHAMMADIYAH SURAKARTA
FAKULTAS KOMUNIKASI DAN INFORMATIKA
PROGRAM STUDI INFORMATIKA
Jl. A Yani Tromol Pos 1 Pabelan Kartasura Telp. (0271)717417, 719483 Fax (0271) 714448
Surakarta 57102 Indonesia. Web: http://informatika.ums.ac.id. Email: informatika@ums.ac.id



MONITORING SYSTEM FOR ACADEMIC ACTIVITY OF MUHAMMADIYAH VOCATIONAL SCHOOL IN CENTRAL JAVA

Abstract

Muhammadiyah is an Islamic organization that has several levels of institutional networks, which one of them is Institution Center of Muhammadiyah in Central Java. It has a policy on the whole of activity in Central Java province, including in the education field. In implementing its policy education field, the instiurion is still difficult to monitor outcomes academic activities of Muhammadiyah Vocational School throughout Central Java. The examples are to determine which schools should be given a scholarship, which schools need repairs, information about students, information about teachers and education personnel, information about facilities and infrastructure conditions of schools, etc. This happens because there is not computerized monitoring system of academic activities so that the development of Muhammadiyah Vocational School was less than the maximum. Therefore, in this study will be built a web-based monitoring system to monitor it. This monitoring system is built using waterfall method where the working each phase must be completed before proceeding to the next phase. The monitoring system is expected to facilitate the institution in monitoring outcomes academic activities of Muhammadiyah Vocational School. In addition, this system can facilitate the general public in the search for information related to education basic data and partial data of Muhammadiyah Vocational School throughout central java completely.

Keywords: Academic Activity, Monitoring System, Muhammadiyah Organization, Waterfall Method.

1. INTRODUCTION

Muhammadiyah is Islamic organization founded by K. H. Ahmad Dahlan in Kauman Yogyakarta on November 18, 1912. The organization aims to restore the entire deviation that occurred in the process of Islamic da'wah. These deviations often lead to the Islamic Shari'a be mixed with tradition in certain areas for reasons of adaptation. To enforce and uphold the Islamic religion in order to reach the Islamic society in truth, Muhammadiyah take various business includes the field of propaganda, social, educational, economic, political, and so forth. The role of education is realized by establishing primary schools and secondary schools of Muhammadiyah, which until now has spread widely in the country and abroad.

This study aims to facilitate the Institution Center of Muhammadiyah in monitoring academic activity outcomes of Muhammadiyah Vocational School in the entire region of Central Java. This is done because there are some problems that occur in the field, among others: (a) The Institution Center of Muhammadiyah is difficulties in monitoring outcomes academic activities Muhammadiyah Vocational School throughout Central Java. (b) The absence of computerized monitoring system for academic activities so that the development of Muhammadiyah Vocational School was less than the maximum. (c) Public society finds difficulty in obtaining basic data information of Muhammadiyah

Vocational School throughout Central Java which is complete and oriented Geographic Information System (GIS).

Geiko & Danilova (2003), said that in order to monitor academic activities not only assess the quality of knowledge but also must implement a total quality control methods of education such as the interaction time, subject, students, and teachers. The use of automatic monitoring system against academic activities meant to control and diagnose all the action during the academic process takes place. It is necessary for the educational process that oriented to goals and dynamic predictions. The result of this process is to get material for learning and correction.

Monitoring activities will be realized by building a computerized monitoring system that is useful for monitoring activities throughout the academic of Muhammadiyah Vocational School in Central Java so that the development will be more leverage. Beatrice W. Ndungu (2015) in his paper entitled "Influence of Monitoring and Evaluation by Principals on Effective Teaching and Learning in Public Secondary Schools in Githunguri District" said monitoring study is an activity to check and observe an object that is done continuously and systematic. This activity aims to assess and evaluate the feasibility of such objects. Then this activity requires data of the past to be used as a comparison with the data now.

Basic data and spatial data contained in this monitoring system is taken from the basic data of primary and secondary education that issued by the Ministry of Education and Culture (Kemdikbud) and Ministry of Religion (Kemenag). Collecting data was obtained from Kemdikbud system and Emis Pendis system (owned Kemenag) by using web scraping technique. Web scraping is a technique to collect data or information with predetermined parameters of a particular website. Eloisa Vargiu & Mirko uRRu (2013) says that web scraping is the set of techniques used to automatically get some informations from a website instead of manually copying it. The purpose is to dig certain information by parsing the web destination then the information is stored in a database with a structure that has been created and then display it into new website. This web scraping will be conducted in Kemdikbud system and Emis Pendis system by running on each semester once. It is necessary to update the underlying data so that all data will be equal to the principal underlying data of both. The purpose of this update is to maintain data consistency between the principal of the Institution Center of Muhammadiyah in Central Java with the destination systems so that the underlying data can be accounted for.

Basic data and spatial data is processed and stored into a system and presented into an information system completely and accurately. The data management process is certainly a weight of its own because of the large data that constantly update. Management and data storage will be a serious problem if not using a database approach so that complicates the process of changing the data

structure. In today's age of information technology advances very rapidly and it cannot be separated from all fields, because by using computer applications will enhance the performance of information system, such data is processed into a more complete, accurate, convenient and timely (Agus Widowo, Mutalazimah, and Bana Handaga, 2015).

This monitoring system is built with the hope to facilitate the Institution Center of Muhammadiyah in monitoring activities throughout the academic of Muhammadiyah Vocational School in Central Java with a computerized system. The school also can be easier to get the latest information from the institution about script documents related to the matter or any other document issued. In addition, the system is also expected to facilitate the general public in the search for information related to education basic data and partial data of Muhammadiyah Vocational School throughout Central Java.

2. METHOD

This monitoring system will be built using one of the methodologies that are often used by IT companies is the waterfall methodology. This methodology is one method in SDLC (System Development Life Cycle), which has a characteristic where the working each phase must be completed before proceeding to the next phase. Stages of software development refers to the waterfall method can be seen in Figure 1.

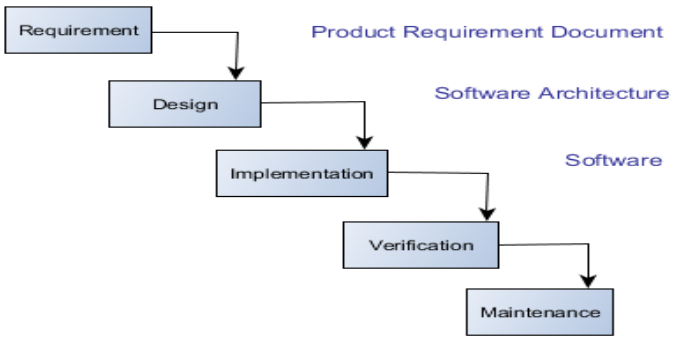


Figure 1. Waterfall methodology cycles

2.1 Requirements

Analyzing all the needs of the user and the application development process in accordance with the target to be achieved. The requirements related to this study include: Updating education basic data of Muhammadiyah Vocational School throughout Central Java according to basic data published by Kemdikbud and Kemenag each semester, the management of basic data by the Institution Center of Muhammadiyah or operator of school, upload documents by the in stitution, download documents by operator of the school, output data summary principal in every school, display

information of basic data and recapitulation result in a web-based monitoring system that want to be built.

2.2 Design

At this stage the design of the system will be built in accordance with the needs of users mentioned in the requirements phase. This design stage include: system design based on UML (Unified Modeling Language), architecture design, database design, user interface design, and the technology designs that will be used to build the monitoring system.

2.2.1 System Design Based On UML

System design based on UML in this study will use some of the diagram include use case diagrams and activity diagrams. Use case in this system consists of three users who have privileges each. First, the user with the highest privileges is admin of the Institution Center of Muhammadiyah where the user is able to use all the features that are built on this system. In addition, this user can upload manuscripts and other documents. Second, the school operator is a user who has permission to use some features relating to the interests of their respective schools. This user can access data management of teachers and employee, data management of student and data management of school infrastructure. The manuscript items and documents that have been uploaded by admin of the institution can be downloaded by this user. Third, the public user has lowest privileges on this system. Public can only see the information that is displayed in front of the website and download the recapitulation data of school. Use case of the monitoring system can be illustrated in Figure 2.

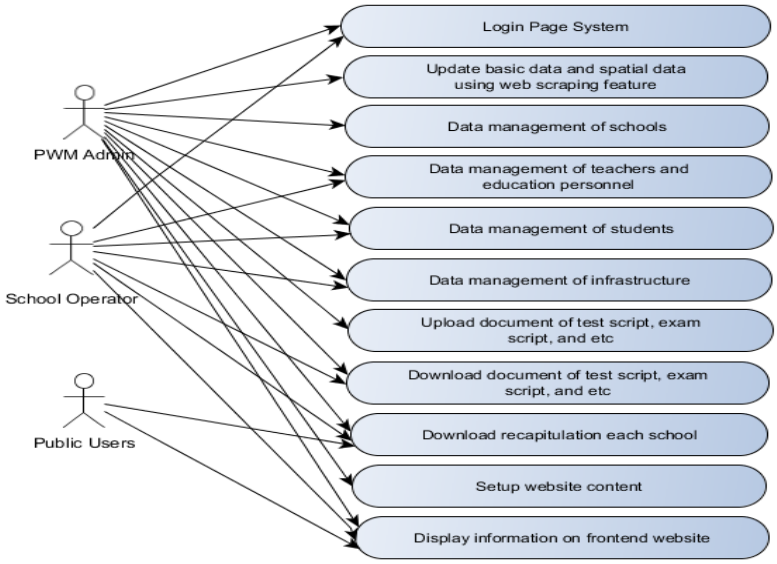


Figure 2. Use case diagram

In this research, there is a main activity diagrams that are implemented in this monitoring system. The activity diagram describes management activity of school data include updating the basic data

with web scraping techniques on Kemdikbud system and Emis Pendis system by admin of the institution, then manage the basic data of school by operator respectively, downloading the basic data recapitulation of school by public user. Activity diagram that describes the data management of school can be seen in Figure 3.

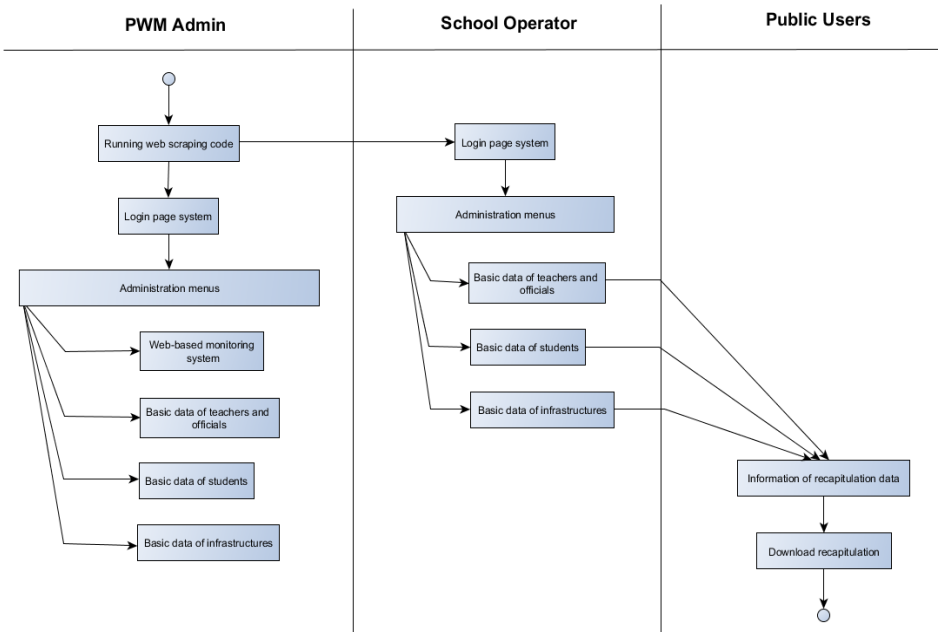


Figure 3. Activity diagram of management basic data

2.2.2 Architecture Design

The outline of architecture design that designed to establish a monitoring system is the retrieval of data sources from two different systems. The architectural design of the monitoring system can be illustrated in Figure 4.

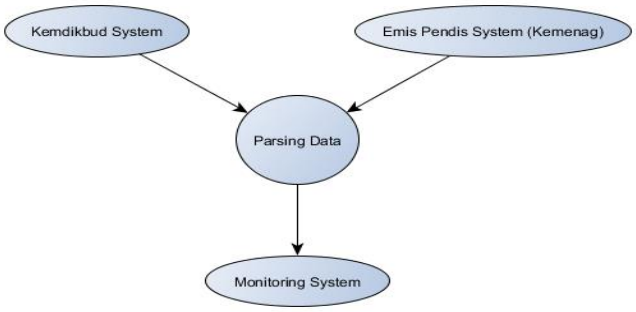


Figure 4. Architecture design of monitoring system

The first data source is taken from Kemdikbud system and the second data source is taken from Emis Pendis systems owned by Kemenag. Both of these systems will be parsed their basic data and

spatial data using a program that has been made then the data will be stored to database of this monitoring system to be displayed into a new website.

2.2.3 Database Design

The monitoring system for academic activities throughout Muhammadiyah Vocational School in Central Java can be seen in Figure 5.

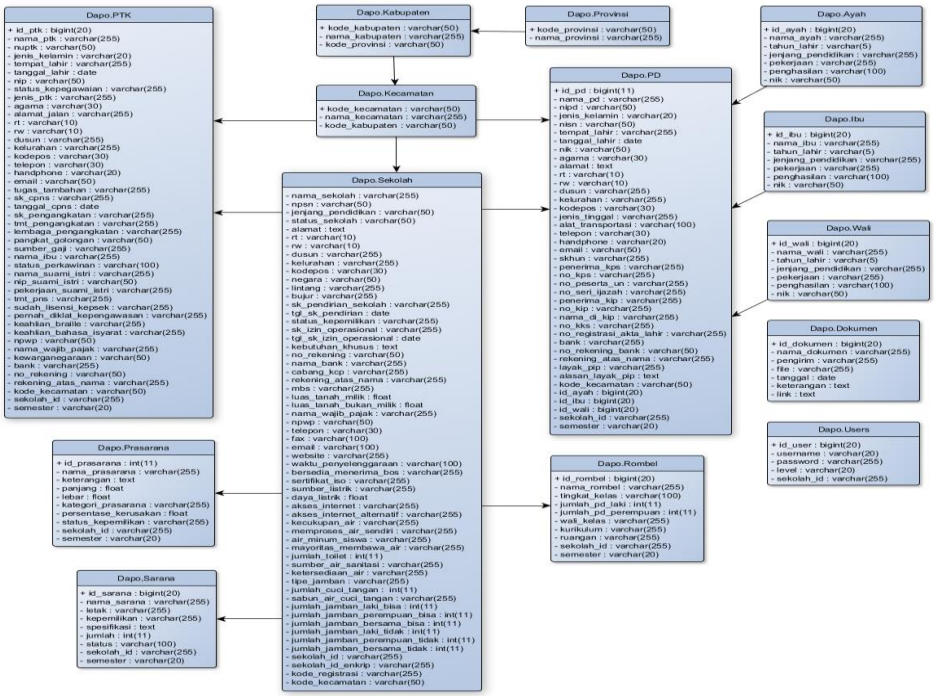


Figure 5. Database design of monitoring system

The use of the database at the top in this monitoring system is as follows. 1) *Table of Users* is used to handle access rights where user must login by entering username and password. 2) *Table of Provinsi, Table of Kabupaten, Table of Kecamatan, Table of Sekolah, Table of PTK, Table of PD, Table of Rombel, Table of Sarana, and Table of Prasarana* are used to store data from both source system data as parsing results. 3) *Table of Ayah, Table of Ibu,* and *Table of Wali* are used as additional tables for details of students who have a father, mother, or guardian. The third table has a relation to the *Table of PD*. 4) *Table of Dokumen* serves to accommodate document uploaded by the admin and then downloaded by the operator of school.

2.2.4 Interface Design

The monitoring system to be built has responsive backend and frontend. Some core designs of the interface design as follows.

a. Login Page

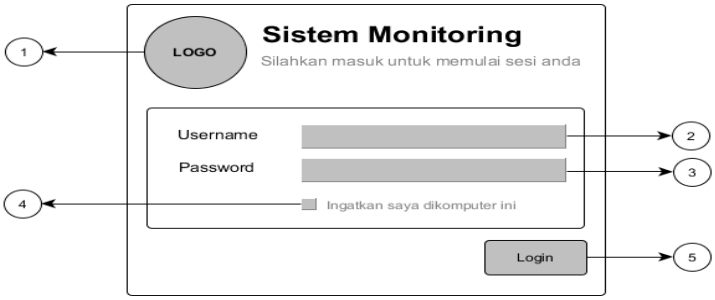


Figure 6. Login page

Information:

- No 1: Logo of Muhammadiyah.
- No 2: Input field of username.
- No 3: Input field of password.
- No 4: Check field to save username and password session.
- No 5: Button to execute login process.

b. Page of School Detail

Figure 7. Page of school detail

Information:

- No 1: Main menus of front website.
- No 2: Logo of Muhammadiyah.
- No 3: Logout menu is used when user want to log out.
- No 4: Username menu is appear after user log in.
- No 5: Field of activity will display an activities undertaken.

- No 6: Select field of semester is used to choose what semester of recapitulation that want to display.
- No 7: Table of student, teacher, and official.
- No 8: Table of facilities and infrastructure.
- No 9: Table of learning group.
- No 10: Footer of front website.

2.2.5 Technology Design

The monitoring system will be built using two main programming language are Python and PHP. Python programming language used to make web scraping technique in Kemdikbud system and Emis Pendis system. While PHP programming language used to create a web-based monitoring system. In addition, this study requires some software and hardware technologies that support for building web-based monitoring system. Software technology that used include: Sublime Text 3, PyCharm Community Edition 2016.2, WAMP Server 3.0.4, Google Chrome web browser, yEd version 3.16.2.1. Hardware technologies used include: Laptop with Intel Core i3 processor, 8 GB RAM, 500 GB hard drive, and Windows 10 operating systems.

2.3 Implementation

Implementation phase of this research is building execution for monitoring system based on user needs and design systems that have been designed. The program core of monitoring system is how to update school basic data taken from the both destination systems in each semester. The basic data retrieval using web scraping technique. The programming language used to perform such technique is Python 2.7. Some modules used to build the program include: urllib2, hashlib, MySQLdb, Beautiful Soup 4.4.0.

Retrieval of data from the both source system uses a different way because they have a different structure retrieval on each system. Data in the Kemdikbud system was taken using full script. So by running one execution, the program will parse all data that needed with parameter of semester. Flowchart of parsing data in Kemdikbud system can be seen in Figure 8.

Workflow of parsing data in Kemdikbud system has many stages iteration. The first iteration is used to retrieve data for all provinces in the system list. Then the program will run the second iteration if only it is Central Java province. The next iteration will take data of counties, districts, and schools. After data of school is captured, the process is continued to get detail of school along with the recap. Recapitulation data are taken based on the parameters of semester when running this program. The program will check if the data already exists in the database then it will be made to update the data, but if the data is not in the database then it will be made to insert the data.

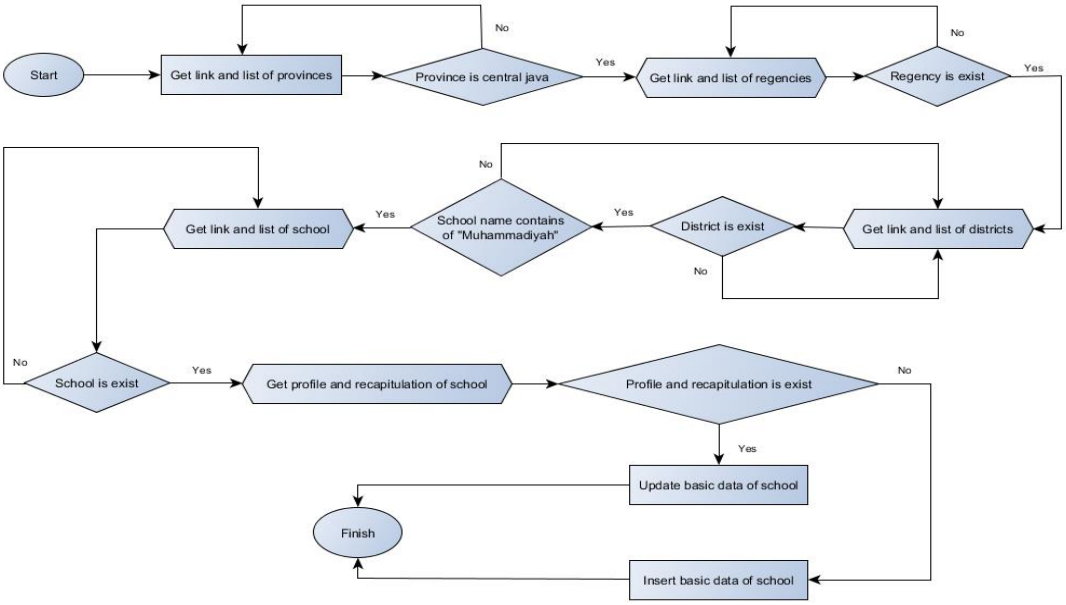


Figure 8. Flowchart of parsing data in Kemdikbud system

Data in the Emis Pendis system was retrieved using several stages. First, do a search on the website of Emis Pendis by inputting parameter of desired area. The result was appear as a table of school lists then it was copied. Second, open Microsoft Excel, paste the coppied table, and save the file on a computer. Third, Import the school data from an excel file that has been saved to the monitoring system through the admin page. Flowchart of parsing data in Emis Pendis system can be seen in Figure 9.

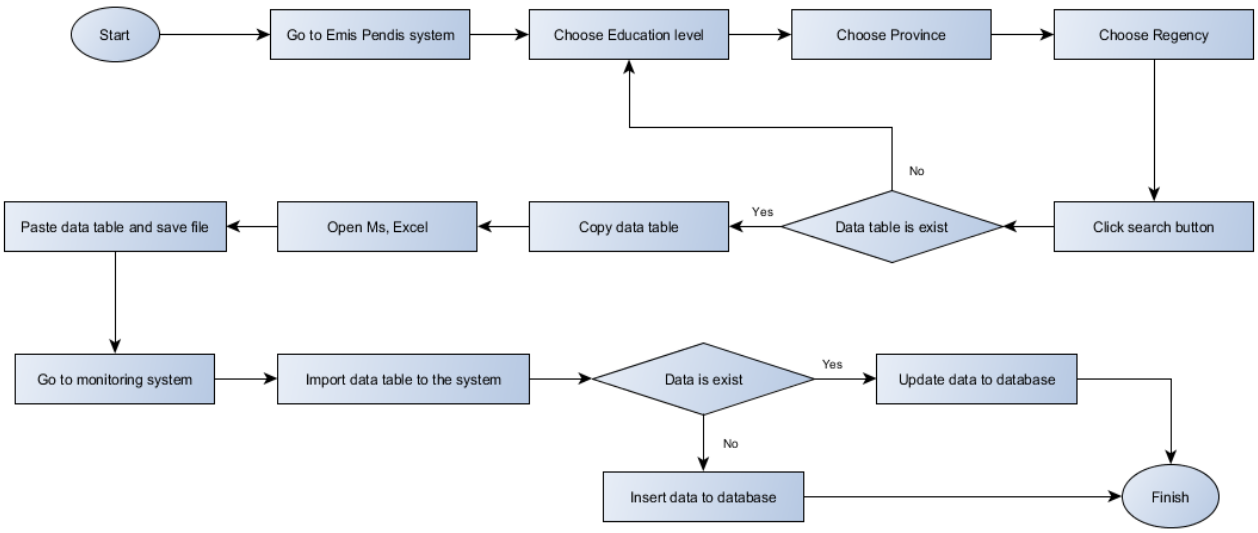


Figure 9. Flowchart of parsing data in Emis Pendis system

Website of monitoring system creation in this research is using CodeIgniter 3.0.1 with HMVC method (Hierarchical Model View Controller). Additional specifications used to establish monitoring

systems are PHP 6.5.19, Apache web server v2.4.9, MySQL 7.5.11 as a Database Management System (DBMS). Some plugins, asset, and framework used include: Bootstrap version 3.3.7, Font Awesome version 4.6.3, AdminLTE 2, Sweetalert, Jquery 2.1.4, Jquery UI 1.9.2, Datatables, Selectize, and DateTimePicker.

2.4 Verification

Testing of monitoring system conducted to validate and verify that the system built is appropriate with all user needs, system design that has been designed, and it works as expected. In this study, the test is done by using two methods, they are Black Box testing and Apache Benchmark testing. Black box testing is a testing method that focuses on the functional specification of the software, the tester can define a set of inputs and perform tests on the functional specification program. This method can be implemented on multiple levels of software testing. Apache Benchmark testing use one of Apache2 web server tools called Apache Benchmark version 2.3. This tools used to measure the performance and capabilities of apache to serve the client requests. The way to run this tool is by opening command prompt in windows and then go to the path *C: \ wamp \ bin \ apache \ apache2.4.9 \ bin*. In this monitoring system testing will be done as much as 4 times by executing the following command:

ab –n 1000 –c 100 http://localhost/pwm/

ab –n 1000 –c 200 http://localhost/pwm/

ab –n 2000 –c 100 http://localhost/pwm/

ab –n 2000 –c 200 http://localhost/pwm/

Explanations:

a. *ab*: The main syntax for running Apache Benchmark tools.
b. *-n*: The number of content requests that will be made to the web server.
c. *-c*: How many concurrent connections are opened or the number of visitors at one time.

2.5 Maintenance

The software has been built still requires care to maintain the functionality and free of errors (bugs) during use. Error in the software often occurs if the verification stage is not carried out to the maximum. In addition, new requirements by user also lead to revise the software that has been built. Therefore the software maintenance should be done regularly so that the software can be used in the long term.

3. RESULT AND DISCUSSION

3.1 Black Box Testing

Black box testing is a testing method that focuses on the functional specification of the software, the tester can define a set of inputs and perform tests on the functional specification program. This

method can be implemented on multiple levels of software testing. The author will show the results obtained from the operation of the monitoring system based on real conditions. Documentation of the Black Box Testing results systems in Table 1.

Testing of parsing data in the Kemdikbud system was done at night because the interest system was not getting a lot of requests from clients so that the retrieval data would be lighter. Program of this parsing data was run at 22:40 pm and finished at 4:35 AM so the program runs approximately 5 hours 55 minutes. The program was run not only take recapitulation data, but also to input, update, and delete basic data related to the table of recapitulation that has appropriate number listed in the recapitulation data so that the program will run longer. Testing of parsing data on Emis Pendis system does not require a long time but the user must perform several steps to be able to take all the required data so that data retrieval is arguably not automatic. This parsing data only took less than an hour.

Table 1. Black Box testing

No.	Scenario	Test Case	Expectation	Result
1	Web scraping feature	Parsing basic data and spatial data from the destination website.	Get all data needed from the destination website, then the data was stored to the system.	Valid
2	Login Testing	Select user access right by inputing username and password.	System will check and validate the access right, then the user will be redirected to admin page when successfully or show error message when failed.	Valid
3	Management basic data and spatial data	Editing basic data and spatial data by operator of school.	The data was modified successfully by operator of school, then it was displayed as recapitulation.	Valid
4	Upload document form	Uploading document from admin page.	The document was uploaded successfully and saved into database.	Valid
5	Download Document	Download document from front website.	The document was downloaded successfully and saved into PC's user.	Valid

Proof of this web scraping program that produces valid data with the both source system was by comparing between data in this monitoring system and data in the source system. For example, it has taken some data from a school on each the source system. The data that served as examples of the comparison can be visited at the following URL.

URL of school data in the Kemdikbud system:

http://dapo.dikdasmen.kemdikbud.go.id/sekolah/D062B888469877EA6A8F

URL of school data in the Emis Pendis system:

http://emispendis.kemenag.go.id/emis2016v1/index.php?jpage=d3dwWnQvNk0xRHRLcjZBdHFKTUFTcHpRRE9aSXBhU29TWGVmMWdZRFRGRT0=

Comparison of data between the Kemdikbud system and this monitoring system uses data of Muhammadiyah Elementary School of Cilopadang. Comparison results of the school profile data is in table 2 and the school recapitulation data is in table 3. The compared data is in the second semester of the academic year 2016/2017.

Table 2. Comparison of school profile data between monitoring system and Kemdikbud system

No.	School Profile	Monitoring System	Kemdikbud System	Result
1	Headmaster	Heru Tomo	Heru Tomo	Valid
2	Operator	muadz ibnu yakin assuni	muadz ibnu yakin assuni	Valid
3	Curriculum	KTSP	KTSP	Valid
4	NPSN	20338695	20338695	Valid
5	Status	Swasta	Swasta	Valid

Table 3. Comparison of recapitulation data between monitoring system and Kemdikbud system

No.	School Recapitulation	Monitoring System	Kemdikbud System	Result
1	Student (M)	91	91	Valid
2	Student (FM)	78	78	Valid
3	Teacher (M)	4	4	Valid
4	Teacher (FM)	5	5	Valid
5	Official (M)	1	1	Valid
6	Official (FM)	0	0	Valid
7	Class	6	6	Valid
8	Laboratory	0	0	Valid
9	Library	0	0	Valid

Comparison of data between the Emis Pendis system and this monitoring system uses data of MAS Mu`allimin Muhammadiyah of Surakarta. Comparison results of the school profile data is in

table 4 and the school recapitulation data is in table 5. The compared data is in the second semester of the academic year 2016/2017.

Table 4. Comparison of school profile data between monitoring system and Emis Pendis system

No.	School Profile	Monitoring System	Emis Pendis System	Result
1	NPSN	20363064	20363064	Valid
2	Curriculum	KTSP 2006	KTSP 2006	Valid
3	Status	Swasta	Swasta	Valid
4	Accreditation	B	B	Valid

Table 5. Comparison of recapitulation data between monitoring system and Emis Pendis system

No.	School Recapitulation	Monitoring System	Emis Pendis System	Result
1	Student (M)	9	9	Valid
2	Student (FM)	15	15	Valid
3	Teacher (M)	0	0	Valid
4	Teacher (FM)	1	1	Valid
5	Official (M)	4	4	Valid
6	Official (FM)	2	2	Valid

Documentation of all recapitulation as the results of parsing data in the Kemdikbud system and Emis Pendis system in the second semester of the academic year 2016/2017 is attached in table 6.

Table 6. All recapitulation of parsing data in the both source system

No.	Data Category	Semester/ Year	Amount of Data from Kemdikbud System	Amount of Data from Emis Pendis System
1	School Data	Odd/ 2016	762	693
2	Student Data	Odd/ 2016	202.510	93.719
3	Teacher and Official Data	Odd/ 2016	14.704	6.027
4	Learning Group Data	Odd/ 2016	7.750	0
5	Infrastructure Data	Odd/ 2016	9.430	5.214

3.2 Apache Benchmark Testing

Tests using Apache Benchmark was used to test web-based monitoring system that has been built. The test is performed four times with different parameters. Here is the complete documentation of test results in table 7.

Table 7. Apache Benchmark testing

No.	-n	-c	Request Per Second
1	1000	100	7.16
2	1000	200	6.78

Table 7. Apache Benchmark testing

No.	-n	-c	Request Per Second
3	2000	100	6.67
4	2000	200	6.51

The results of some tests are contained in the **Request Per Second** column. The column means that the server used to serve how many requests per second for the URL tested.

3.3 Result

First, based on the results of Black Box testing shown in Table 1, it can be concluded that this monitoring system has worked well. Some features contained in the core of the system has been running smoothly and functioning properly.

Second, the results of system test using Apache Benchmark has been running smoothly without any errors occurred. Results of **Request Per Second** column in Table 2 indicates that the value contained in the column is dropped. Proven in the first row to the fifth row shows the decline in value when the parameter (-n and -c) is raised. In addition to these results, the server performance also depends on the server configuration that has been set when the first installation and the hardware used on the computer.

3.4 Analysis

Based on the both results of testing that was done on this monitoring system, that the system has been successfully executed as functionally and technically. The system is able to facilitate the Institution Center of Muhammadiyah to monitor outcomes academic activities of Muhammadiyah Vocational School throughout Central Java. With the computerized monitoring system, the development of Muhammadiyah Vocational School in Central Java can be realized to the fullest. For

example, by seeing condition of the existing schools in the system then the Institution Center of Muhammadiyah can know which school deserves the scholarship and which schools are not. The Institution Center of Muhammadiyah also can know the condition of facilities and infrastructure that exist in a particular school. In addition, web-based monitoring system that has been built is to help people who find difficult to obtain information about basic data and spatial data of Muhammadiyah Vocational School in Central Java that is complete and clumped.

On the other hand, there are still some shortcomings in the monitoring system. 1) Parsing data in the Emis Pendis system was not fully using full script so users must perform several steps to obtain the required data. 2) Data will be updated only when admin running the web scraping program. Generally admin update data every semester only once, when the destination website update data at any time, the data contained in this website will not immediately update. 3) When the turn of semester, operator of school must re-edit detail of basic data. This occurs because the destination website only displays the amount of data substantially while detail of basic data is essentially inaccessible. The destination website is certainly to protect detail of basic data for reasons of security issues. So the user must be logged in as admin or operator to access detail of basic data, while the author does not have access rights to log in to the destination website.

4. CONCLUSION

In this research has been produced a monitoring system with data sources obtained from the two systems, namely the Kemdikbud system and Emis Pendis system. This monitoring system will facilitate the Institution Center of Muhammadiyah to conduct monitoring of academic activities at Muhammadiyah Vocational School in Central Java. With a computerized monitoring system, the management of large data is no longer a problem because the system uses a database approach. In the end all parties who wish to seek information about the basic data and spatial data across the Muhammadiyah Vocational School in Central Java will be obtained easily and completely. Although there are still some shortcomings in the monitoring system, but functionally it has been going well.

4.1 Advice

When using web scraping feature, the authors suggest to run the program at night because the process is very long. Computer and internet connection should always standby and stable when running the program. Another reason why the program should be run at night is because the destination website will be much lighter to be parsed because incoming requests on the website is not much.

BIBLIOGRAPHY

Vargiu, Eloisa & Urru, Mirko. (2013). *Exploiting web scraping in a collaborative filtering- based approach to web advertising.* Artificial Intelligence Research, Vol. 2, No. 1.

Geiko, O. D. & Danilova, E. A. (2003, April). *Automated System Of Academic Activities Monitoring.* In Modern Techniques and Technologies, 2003. MTT 2003. Proceedings of the 9th International Scientific and Practical Conference of Students, Post-graduates and Young Scientists (pp. 247-249). IEEE.

Ndungu, Beatrice W., Allan, Gathu & Emily, Bommet J. (2015). *Influence of Monitoring and Evaluation by Principals on Effective Teaching and Learning in Public Secondary Schools in Githunguri District.* Journal of Education and Practice, Vol. 6, No. 9.

Widodo, A., Mutalazimah, M., & Handaga, B. (2015, May). *Effectivity of Child Nutritional Status Monitoring Based on Information Technology at District Health Office, Sukoharjo Regency.* In ASEAN/Asian Academic Society International Conference Proceeding Series.